

RECEIVED
CENTRAL FAX CENTER

SEP 28 2007

A. AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

10/01/2007 PCHOMP 00000051 100460 10736120
01 FC:1201 600.00 DA

12-14. (Canceled)

15. (Currently amended) A diversity signal combiner system for a digital communications system, comprising:
- a plurality of channels each for receiving a channel signal of a plurality of channel signals from a spatially diverse antenna array element;
 - a plurality of downconverters each on one of the plurality of channels for downconverting a corresponding channel signal to baseband;
 - a co-phasing software block for resolving phase differences among the plurality of channel signals after the plurality of channel signals are downconverted by the plurality of downconverters;
 - a combiner for combining the plurality of channel signals by weighting and delaying each of the plurality of channel signals after the co-phasing software block resolves the phase differences among the plurality of channel signals;
 - a symbol synchronizer for determining symbol boundaries of the plurality of channel signals after the combiner combines the plurality of channel signals to enable a system signal to be accurately demodulated to accurately represent transmitted data; and
 - an equalizer for receiving the plurality of channel signals from the combiner, for providing channel estimates of complex channel gain when necessary, and for removing channel

effects from the plurality of channel signals before the plurality of channel signals are input into the single complex sliding window matched filter;

wherein the symbol synchronizer includes a single complex sliding window matched filter for filtering the plurality of channel signals with a match filtering function based on predetermined signal transfer function characteristics to average noise out of the plurality of channel signals and thereby maximize a signal-to-noise ratio of each of the plurality of channel signals; and

~~The diversity signal combiner system of claim 14,~~ wherein the symbol synchronizer is for providing a variable step size parameter to the equalizer according to a confidence measure of correct symbol boundary estimation.

16. (Currently amended) A diversity signal combiner system for a digital communications system, comprising:

a plurality of channels each for receiving a channel signal of a plurality of channel signals from a spatially diverse antenna array element;

a plurality of downconverters each on one of the plurality of channels for downconverting a corresponding channel signal to baseband;

a co-phasing software block for resolving phase differences among the plurality of channel signals after the plurality of channel signals are downconverted by the plurality of downconverters;

a combiner for combining the plurality of channel signals by weighting and delaying each of the plurality of channel signals after the co-phasing software block resolves the phase differences among the plurality of channel signals;

a symbol synchronizer for determining symbol boundaries of the plurality of channel signals after the combiner combines the plurality of channel signals to enable a system signal to be accurately demodulated to accurately represent transmitted data;

an equalizer for receiving the plurality of channel signals from the combiner, for providing channel estimates of complex channel gain when necessary, and for removing channel effects from the plurality of channel signals before the plurality of channel signals are input into the single complex sliding window matched filter; and

~~The diversity signal combiner system of claim 14, further comprising~~ an adaptive weight, delay and phase adapter connected between the combiner and the equalizer for estimating and correcting phase gain, frequency and sampling error effects, and for receiving feedback from the single complex sliding window matched filter and the symbol synchronizer for providing a variable step size parameter, and fast error convergence, in the equalizer[.];

wherein the symbol synchronizer includes a single complex sliding window matched filter for filtering the plurality of channel signals with a match filtering function based on predetermined signal transfer function characteristics to average noise out of the plurality of channel signals and thereby maximize a signal-to-noise ratio of each of the plurality of channel signals.

17. (Original) The diversity signal combiner system of claim 16, wherein the equalizer is connected to the adaptive weight, delay and phase updater via a feedback loop to accept a new value of the variable step size parameter and to return a combined channel signal estimate to the adaptive weight, delay and phase updater.

18-20. (Canceled)

21. (Currently amended) A diversity signal combiner system for a digital

communications system, comprising:

a plurality of channels each for receiving a signal from a spatially diverse antenna array element;

a plurality of downconverters each on one of the plurality of channels for downconverting a corresponding plurality of channel signals to baseband;

a plurality of matched filters each being located on one of the plurality of channels for filtering the corresponding plurality of channel signals with a match filtering function based on predetermined signal transfer function characteristics to average noise out of the corresponding plurality of channel signals to maximize a signal-to-noise ratio of each of the plurality of channel signals;

a combiner for combining each of the plurality of channel signals output from the plurality of matched filters by appropriately weighting and delaying each of the plurality of channel signals;

a symbol synchronizer for determining symbol boundaries of the plurality of channel signals output from the plurality of matched filters as the combiner weights and delays each of the plurality of channel signals, thereby causing a single combined signal with digital sampling to be output from the combiner;

an adaptive delay/phase updater for receiving digitally sampled signals from a variable delay in each of the plurality of channels; and

The diversity signal combiner system of claim 20, further comprising an equalizer for generating a signal phase/delay estimation error and for inputting the signal phase/delay estimation error into the adaptive phase/delay updater;

wherein the symbol synchronizer is further for generating a confidence measure and inputting the confidence measure into the adaptive phase/delay updater; and

wherein the adaptive phase/delay updater measures and updates the signal phase/delay estimation error based on the confidence measure.

22-23. (Canceled)

24. (Currently amended) A diversity signal combiner system for a digital communications system, comprising:

a plurality of channels each for receiving a signal from a spatially diverse antenna array element;

a plurality of downconverters each on one of the plurality of channels for downconverting a corresponding plurality of channel signals to baseband;

a plurality of matched filters each being located on one of the plurality of channels for filtering the corresponding plurality of channel signals with a match filtering function based on predetermined signal transfer function characteristics to average noise out of the corresponding plurality of channel signals to maximize a signal-to-noise ratio of each of the plurality of channel signals;

a combiner for combining each of the plurality of channel signals output from the plurality of matched filters by appropriately weighting and delaying each of the plurality of channel signals;

a symbol synchronizer for determining symbol boundaries of the plurality of channel signals output from the plurality of matched filters as the combiner weights and delays each of the plurality of channel signals, thereby causing a single combined signal with digital sampling to be output from the combiner;

an equalizer for receiving the combined channel signals from the combiner and for providing combiner weight updating on the plurality of channels signals; and

~~The diversity signal combiner system of claim 23, further comprising a sampling time update block for executing a sampling time update equation and for outputting results of the executed sampling time update equation to the plurality of downconverters to control a sampling time of the plurality of channel signals input to the plurality of downconverters.~~

25. (Original) The diversity signal combiner system of claim 24, wherein the symbol synchronizer is further for providing confidence measures to both the equalizer and the sampling time update block to provide adjustable step size in both the sampling time update block and the equalizer.

26. (Canceled)

27. (Original) A diversity signal combiner system for a digital communications system, comprising:

a plurality of channels each for receiving a signal from a spatially diverse antenna array element;

a plurality of downconverters each on one of the plurality of channels for downconverting a corresponding plurality of channel signals to baseband;

a plurality of matched filters each being located on one of the plurality of channels for filtering the corresponding plurality of channel signals with a match filtering function based on predetermined signal transfer function characteristics to average noise out of the corresponding plurality of channel signals to maximize a signal-to-noise ratio of each of the plurality of channel signals;

a combiner for combining each of the plurality of channel signals output from the plurality of matched filters by appropriately weighting and delaying each of the plurality of channel signals;

a symbol synchronizer for determining symbol boundaries of the plurality of channel signals output from the plurality of matched filters as the combiner weights and delays each of the plurality of channel signals, thereby causing a single combined signal with digital sampling to be output from the combiner; and

an equalizer for receiving the combined channel signals from the combiner and for providing combiner weight updating on the plurality of channels signals;

wherein the equalizer further includes a vector line for accepting output samples from the plurality of matched filters, the equalizer further for estimating a complex channel gain for each of the plurality of channels based on the accepted output samples; and

~~The diversity signal combiner system of claim 26,~~ wherein the equalizer is further for generating a weight vector output for correcting channel complex gain errors.

28. (Canceled)

29. (Currently amended) A diversity signal combiner system for a digital communications system, comprising:

a plurality of channels each for receiving a signal from a spatially diverse antenna array element;

a plurality of downconverters each on one of the plurality of channels for downconverting a corresponding plurality of channel signals to baseband;

a plurality of matched filters each being located on one of the plurality of channels for filtering the corresponding plurality of channel signals with a match filtering function based on predetermined signal transfer function characteristics to average noise out of the corresponding plurality of channel signals to maximize a signal-to-noise ratio of each of the plurality of channel signals;

a combiner for combining each of the plurality of channel signals output from the plurality of matched filters by appropriately weighting and delaying each of the plurality of channel signals;

a symbol synchronizer for determining symbol boundaries of the plurality of channel signals output from the plurality of matched filters as the combiner weights and delays each of the plurality of channel signals, thereby causing a single combined signal with digital sampling to be output from the combiner; and

an equalizer for receiving the combined channel signals from the combiner and for providing combiner weight updating on the plurality of channels signals;

~~The diversity signal combiner system of claim 23,~~ wherein the symbol synchronizer is further for providing a control signal to the equalizer for providing optimal sampling at an output of the equalizer to minimize a demodulated data bit error rate.